

certificate of membership and the certificate of proficiency in practical agriculture were granted to Mr. R. A. Benson, F.H.A.S., 11, Caledonia Place, Clifton; Mr. W. de Hoghton Birch, 1, Bathwick Street, Bath; and Mr. C. W. Lincoln Hardy, F.H.A.S., Gittisham, Honiton, Devon; and the certificate of proficiency alone to Mr. B. S. Dunning, 2, Warwick Square, S.W.

THE authorities of University College, Liverpool, have asked that that institution be incorporated with Victoria University.

## SOCIETIES AND ACADEMIES LONDON

**Linnean Society,** April 3.—Sir J. Lubbock, Bart., president, in the chair.—Mr. W. Brockbank exhibited a series of double daffodils, wild forms of *Narcissus pseudo-Narcissus*, which were gathered in a Welsh meadow from among many of both the single and double forms occurring there in every stage of growth. Sections invariably revealed stamens and pistils, and in two of the most double forms ovaries filled with seeds were present. With this evidence he therefore contended against the current notion of cultivation and root-growths having produced a heterogeneous multiplication of the perianth segments, split-up crown, and conversion of stamens into petal-growths, his belief being that the plants in question were propagated in the ordinary seed-bearing manner.—Mr. R. M. Middleton showed a jackdaw with albinism of the wing feathers, causing considerable resemblance in the bird to a magpie.—Prof. P. M. Duncan gave a revision of the families and genera of the Sclerodermic Zooantharia, the Rugosa excepted. Since MM. Milne-Edwards and Haines' work, 1857-60, no systematic revision of the Madreporaria has appeared, while since then a great number of new genera have been founded; hence the necessity for a revision has arisen, and more especially in consequence of the morphological researches of Dana, Agassiz, Verrill, and Moseley. Prof. Duncan explained that the old sections of the Zooantharia required modification and addition. In his present revision the sections Aporosa and Perforata remain shorn of some genera, the old family Fungida becomes a section with three families, two of which are transitional between the sections just mentioned. The section Tabulata disappears, some genera being placed in the Aporosa, and the others are relegated to the Hydrozoa according to Moseley. The Tubulosa cease to be Madreporarian. Hence the sections treated are Madreporaria-Aporosa, M.-Fungida, and M.-Perforata. The nature of the hard and soft parts of these forms is considered in relation to classification, and an appeal is made to naturalists to agree to the abolition of many genera, the author having sacrificed many of his own founding. The criticism of 467 genera permits 336 to remain good, and as a moderate number (36) of sub-genera are allowed to continue, the diminution is altogether about 100. The genera are grouped in alliances, the numbers in families being unequal. Simplicity is aimed at, and old artificial divisions dispensed with. There is a great destruction of genera amongst the simple forms of Aporosa, and a most important addition to the Fungida. The genera *Siderastrea* and *Thamnasira* are types of the family Plesiofungida, as are *Microsolonia* and *Cyclolites* of the family Plesioporidae. The families Fungida and Lophoserida add many genera to the great section Fungida. There is not much alteration in respect of the Madreporaria-Perforata, but the sub-family Eusamminae are promoted to a family position as the Eusammida.—Mr. Chas. F. White thereafter read a note on some pollen from funeral garlands found in an Egyptian tomb circa B.C. 1000. It appears that from among the dried flowers of *Papaver Rhæas* the pollen obtained freely absorbed water, became swollen, and in other respects the grains were barely able to be differentiated by the microscope from the pollen grains of the recent poppy.—A paper was read by Mr. F. J. Briant, on the anatomy and functions of the tongue of the honey bee. Authorities, it seems, are yet divided in opinion as to how the organ in question acts. Kirby and Spence, Newport and Huxley, aver the bee laps its food; while Hermann Müller and others attribute a full share to the terminal whorl of hairs to which the honey adheres, and therefore is withdrawn. Mr. Briant, on the other hand, from experiment and study of the structures, is inclined to the view that the honey is drawn into the mouth through the inside of the tongue by means of a complicated pumping action of the organ, aided by the closely contiguous parts.

**Chemical Society,** April 3.—Dr. W. H. Perkin, president, in the chair.—The following papers were read:—On the influence of certain phosphates upon vinous fermentation, by A. G. Salamon and W. de Vere Mathew. It has been suggested that the addition of phosphates to beerworts stimulates the growth of the yeast-plant and increases the rapidity of attenuation of the wort. The authors find that ordinary English wort contains an excess of phosphoric acid over that which is proved by their experiments to be most favourable to fermentation; hence it follows that the addition of phosphates to wort is not advisable.—On the occurrence of rhabdophane in the United States, by W. N. Hartley. The author shows that a new mineral, scovillite, described by Brush and Penfield in the *Amer. Journ. Sci.*, xxv. 459, is but a variety of rhabdophane. In a subsequent number of the journal, March 1884, the identity of the two minerals is recognised by the above authors.

**Geological Society,** April 2.—Prof. T. G. Bonney, F.R.S., president, in the chair.—Frank Gotto and George Varty Smith were elected Fellows, and Dr. E. Mojsisovics von Mojsvár, of Vienna, a Foreign Correspondent of the Society.—The following communications were read:—The rocks of Guernsey, by the Rev. E. Hill, M.A.; with an appendix on the microscopic structure of some of the rocks, by Prof. T. G. Bonney, F.R.S. The southern part of the island is a high plateau consisting entirely of gneiss. This is very coarse, and the bedding is seldom well marked. The bedding, when visible, coincides with the foliation, and the author hopes that hereafter an order of succession may be established. At Rocquaine Castle occur a few slaty beds intercalated in the gneiss, the origin of which is somewhat difficult to understand. The northern part, low ground with hummocks, consists principally of a group of crystalline or sub-crystalline rocks, in constitution diorites or syenites. They are described by Ansted as sedimentary rocks metamorphosed into syenites; but they show no bedding either in the many quarries, or, in general, in the shore outcrops, nor do their varieties occur in any manner indicating an order of succession. They appear at Castle Cornet to meet the gneiss intrusively, and their microscopic structure is igneous. A remarkable appearance of bedded structure at Fort Doyle is the only strong argument for a metamorphic origin, and this may be explained as a caught-up mass in conjunction with crushing-planes. The author therefore regards them as igneous. An oval area between St. Sampson's and St. Peter's Port is occupied by hornblende rocks, locally called "birdseye," which may be described as hornblende-gabbros. These also have been called metamorphic. They too, at Hogue-à-la-Perre and another point, present appearances of bedding; but on the same general grounds as for the preceding group these also are regarded as igneous. Two granitic masses are described: the coarse pink granite of Cobo, on the west coast, and the finer-grained gray granite weathering pink of Lancresse, on the north. Each is seen to intrude: the Cobo granite into gneiss at Hommet Barracks, the Lancresse granite into diorite at Fort Le Marchant. Besides these are some smaller masses. Dykes are remarkably abundant and various. Granites and elvans are plentiful everywhere; felsites very rare. The majority of the dykes are diorites, varying in coarseness and often of enormous size; there is also mica-trap. In some of these dykes a cleavage has been developed, so that some resemble slates. Infiltration-veins are abundant. In relative age the gneiss appears to be the oldest rock, the hornblende-gabbro to be next, then comes the diorite group, while the granites are newer still. Of the dykes the newest are the compactest diorites. As to the absolute geological age of the rocks no satisfactory evidence at present is known; it will have to be sought for in the other islands and in France.—On a new specimen of *Megalichthys* from the Yorkshire coalfield, by Prof. L. C. Miall.—Studies on some Japanese rocks, by Dr. Bundjiro Kotô. Communicated by Frank Rutley. The author has studied series of Japanese rocks from the collection of the Tokio University and the Geological Survey of Japan. The microscopical investigation was carried on at the Mineralogical Institute at Leipzig, under the direction of Prof. Zirkel, and the chemical analyses were made in the laboratory of Prof. Knop. The most abundant rocks are the pyroxene-andesites, which are not of a glassy texture, but for the most part holocrystalline. The most abundant mineral in these rocks is a plagioclase feldspar with twinned and zonal structure, which is proved, by its extinction-angles and by the chemical analysis of its isolated fragments, to be labradorite. Sanadine is present in small quantities. The augites of these rocks present many peculiarities; they are all decidedly

pleochroic; and they exhibit the oblique extinction in basal sections first pointed out by Mr. Whitman Cross, and which is characteristic of triclinic and not of monoclinic crystals. A careful examination of the question has led the author to conclude that the mineral which has lately been regarded as a rhombic pyroxene (probably hypersthene) is really only ordinary augite cut parallel to the optic axis. He does not regard the property of pleochroism as distinctive of hypersthene, while the absence of a brachypinacoidal cleavage and the presence of 10 per cent. of lime in the mineral forbids our referring it to that species. The other abundant minerals in these augite-andesites are magnetite, which is always present, and quartz, which occurs in some of them, both as a primary and a secondary constituent. Hornblende is very rare in these rocks, and when present the peripheral portions of the crystals are seen to be converted into augite, probably by the action of the caustic magma upon them. Enstatite is rare in these rocks, but apatite is always found in them, while tridymite occurs not unfrequently. The author described a number of structural variations in the augite-andesite from different localities. Among the most interesting is a variety containing as much as 69 per cent. of silica. Among the less abundant rocks are the enstatite-andesite, the quartz-augite-andesite, and the hornblende-andesites. The plagioclase-basalts of Japan can only be distinguished from the augite-andesites by the presence in them of olivine. Magma-basalts are rare, most of the varieties being of the dolerite type; but under the name of "basalt-lavas" the author describes varieties with a glassy base. In an appendix some account is given of a number of pre-Tertiary rocks, including granite, one variety of which contains the new mineral, reinite, of Fritsch (the tetragonal form of the ferrous-tungstate), quartz-mica-diorite, diorite-porphry, and diabase.

**Victoria Institute, April 7.**—A paper was read by the Rev. J. M. Mello, F.G.S., on the prehistoric flint implements at Speinnes, implements used by man before the mammoth and rhinoceros had disappeared in Europe. The author described the works at Speinnes, and afterwards said there was one question, namely, were these early men of Europe always in the condition in which they appear to have been living, or were they offshoots of the parent stems of humanity, and had their ancestors no higher civilisation?

#### EDINBURGH

**Mathematical Society, April 10.**—Mr. Thomas Muir, F.R.S.E., president, in the chair.—Dr. Alexander Macfarlane, F.R.S.E., submitted a note on simple, combination, and cumulative voting, after which Mr. A. J. G. Barclay read a paper on the teaching of geometry.—Mr. Muir gave an explanation of an algebraical theorem communicated by Prof. Tait to the January meeting of the Society.

#### MANCHESTER

**Literary and Philosophical Society, February 5.**—Charles Bailey, F.L.S., in the chair.—On the introduction of coffee into Arabia, by C. Schorlemmer, F.R.S.

February 19.—H. E. Roscoe, Ph.D., LL.D., F.R.S., &c., president, in the chair.—Notice of the geology of the Haddon district, eight miles south-west of Ballarat, Victoria, by F. M. Krause, Professor of Geology in the School of Mines, Ballarat. Communicated by the President.

#### PARIS

**Academy of Sciences, April 7.**—M. Rolland in the chair.—An exact or highly approximate calculation of the thrust of sandy masses against their retaining walls, by M. de Saint-Venant.—On the specific heats of water and of carbonic acid at very high temperatures, by MM. Berthelot and Vieille.—Note on Brioschi's theorem respecting symmetrical functions, by M. Sylvester.—Documents relating to the liquid air condensers for several years employed in the piercing of the Mount Ceniz Tunnel, by M. A. de Caligny.—Tabulated results of the various circumstances attending electric discharges during the thunderstorms that occurred in France during the second half of the year 1883, communicated by the Minister of the Posts and Telegraphs.—Telegraphic determinations of the differences of longitude in South America, by M. de Bernardières.—Charts of the atmospheric movements passing over Europe in the various régimes; remarks on their application to the prediction of storms, by M. A. Poincaré.—Note on the influence of luni-solar attraction on the action of pendulums, by M. A. Gaillot.—On

the solar spots observed in Rome during the first three months of the year 1884, by M. P. Tacchini.—Note on the halos of diffused light observed round the sun on March 31 at Auteuil, by M. Ch. Moussette.—On the aspect presented by the Pons-Brooks comet on January 13, 1884, by M. L. Cruls.—Note on an error committed in determining the exact moment of the chief eruption at Krakatoa last year, by M. A. A. Buijskes. This disturbance, generally stated to have occurred a few minutes before noon on August 27, really took place exactly at eight o'clock in the morning of that day. Hence the calculations of the velocities of marine and atmospheric currents based on the former date must be rectified accordingly.—On the principle of the prism of greatest thrust laid down by Coulomb in the theory of the equilibrium of sandy masses, by M. J. Boussinesq.—On the quaternary quadratic formulas, and on the corresponding hyperabelian groups, by M. E. Picard.—On the theory of quaternions in connection with Prof. Sylvester's recent solution of equations in which all the given quaternions are found on the same side as the quaternion sought for, by M. Ed. Weyr.—Note on the application of Faraday's law to the study of the conductivity of saline solutions, by M. E. Bouty.—Note on the verification of the laws of transverse vibrations in elastic rods, by M. E. Mercadier.—Fresh experiments in the liquefaction of hydrogen; solidification and critical point of pressure for nitrogen, by M. K. Olszewski.—On the chief circumstances attending the transformation of superheated octahedral sulphur into prismatic sulphur, by M. D. Gerncz.—Quantitative analysis of the phosphoric acid found in arable lands and in rocks, by M. Ad. Carnot.—On the artificial production of fayalite, by M. Alex. Gorgeu. The author's experiments show that the protochloride of iron, fused with silica, produces fayalite under conditions in which the chloride of manganese yields tephroite. It appears incapable of producing a bisilicate corresponding to rhodonite, and yields chlorosilicate of iron with difficulty. Highly crystallised magnetite and hausmannite may be obtained under analogous conditions by the fusion of their respective chlorides in contact with the air.—Claim of priority of discovery in connection with recent communications on the vitality of virus and of the yeast of beer; letter addressed to the President by M. Melsens.—Researches on the incubation of hens' eggs in confined air, and on the part played by ventilation in the development of the embryo, by M. C. Dareste.—On the variations of electric excitability and of the period of latent excitement in the brain, by M. H. C. de Varigny.—Note on a Siberian pseudo-meteorite, by M. Stan. Meunier.

## CONTENTS

PAGE

Samoa. By J. A. Farrer . . . . .	569
Voice, Song, and Speech. By Dr. W. H. Stone . . . . .	570
Our Book Shelf:—	
Casey's "Sequel to the First Six Books of the Elements of Euclid" . . . . .	571
Ricketts's "Ores of Leadville, and their Mode of Occurrence, &c." . . . .	571
Wiesner's "Elemente der Organographie, Systematik, und Biologie der Pflanzen" . . . . .	572
Letters to the Editor:—	
On the Motion of Projectiles.—E. Ristori . . . . .	572
Christian Conrad Sprengel.—Dr. H. A. Hagen . . . . .	572
Salt-water Fish-Types in Fresh Water.—Prof. Theo. Gill . . . . .	573
"The Axioms of Geometry."—Prof. O. Henrici, F.R.S. . . . .	573
Wild Duck laying in Rook's Nest.—John H. Willmore . . . . .	573
The Remarkable Sunsets.—S. E. Bishop . . . . .	573
Cats on the District Railway.—E. de M. Malan . . . . .	573
The Geodetic Survey of the United States . . . . .	573
Agriculture in Sussex . . . . .	575
Socotra . . . . .	575
The Three Hundredth Anniversary of the University of Edinburgh. By Prof. G. Chrystal . . . . .	577
The Congo. By Prof. A. H. Keane (With Illustrations) . . . . .	579
Notes . . . . .	581
Geographical Notes . . . . .	584
Volcanic Ashes and Cosmic Dust. By John Murray and A. Renard (With Illustrations) . . . . .	585
University and Educational Intelligence . . . . .	590
Societies and Academies . . . . .	591